

**Abstract**

Materials suitable for fabricating optical monitors include amorphous, polycrystalline and microcrystalline materials. Semitransparent photodetector materials may be based on silicon or silicon and germanium alloys. Conductors for connecting to and contacting the photodetector may be made from various transparent oxides, including zinc oxide, tin oxide and indium tin oxide. Optical monitor structures based on PIN diodes take advantage of the materials disclosed. Various contact, lineout, substrate and interconnect structures optimize the monitors for integration with various light sources, including vertical cavity surface emitting laser (VCSEL) arrays. Complete integrated structures include a light source, optical monitor and either a package or waveguide into which light is directed.